

WHAT IS CLAIMED IS:

1. An exhaust emission control system for a vehicle including a primary engine and a secondary engine having a displacement smaller than that of the primary engine, the exhaust emission control system comprising:

5 an exhaust passage having a junction portion at which exhaust gas discharged from the primary engine and exhaust gas discharged from the secondary engine join together; and

an exhaust emission purifying device that purifies the exhaust gas joined at the junction portion in the exhaust passage.

10 2. The exhaust emission control system according to claim 1, wherein the secondary engine is operated to drive an accessory of the vehicle.

3. The exhaust emission control system according to claim 1, further comprising a primary engine exhaust emission purifying device provided between the primary engine and the junction portion so as to purify the exhaust gas discharged from the primary engine.

15 4. The exhaust emission control system according to claim 3, further comprising a primary engine air/fuel ratio detection unit provided between the primary engine exhaust emission purifying device and the junction portion so as to detect an air/fuel ratio of the exhaust gas discharged from the primary engine.

20 5. The exhaust emission control system according to claim 4, wherein the exhaust passage is branched into a plurality of passages between the primary engine air/fuel ratio detection unit and the junction portion, and at least one of the plurality of passages is connected with the junction portion.

25 6. The exhaust emission control system according to claim 1, further comprising:

a first air/fuel ratio detection unit provided between the primary engine and the junction portion for detecting an air/fuel ratio of exhaust gas;

a second air/fuel ratio detection unit provided downstream of the exhaust emission purifying device for detecting an air/fuel ratio of the exhaust gas; and

a controller that controls an air/fuel ratio of air/fuel mixture each admitted into the primary engine and the secondary engine based on the air/fuel ratio detected by the first air/fuel ratio detection unit and the air/fuel ratio detected by the second air/fuel ratio detection unit, respectively.

5 7. The exhaust emission control system according to claim 1, further comprising:

a third air/fuel ratio detection unit provided between the primary engine and the junction portion for detecting an air/fuel ratio of exhaust gas;

10 a fourth air/fuel ratio detection unit provided between the secondary engine and the junction portion for detecting an air/fuel ratio of exhaust gas; and

a controller that controls an air/fuel ratio of air/fuel mixture admitted into the primary engine based on the air/fuel ratio detected by the third air/fuel ratio detection unit, and controls an air/fuel ratio of air/fuel mixture admitted into the secondary engine based on the air/fuel ratio detected by the fourth air/fuel ratio detection unit.

15 8. The exhaust emission control system according to claim 1, further comprising:

a fifth air/fuel ratio detection unit provided between the primary engine and the junction portion for detecting an air/fuel ratio of exhaust gas;

20 a sixth air/fuel ratio detection unit provided between the junction portion and the exhaust emission purifying device for detecting an air/fuel ratio of exhaust gas; and

a controller that controls an air/fuel ratio of air/fuel mixture admitted into the primary engine based on the air/fuel ratio detected by the fifth air/fuel ratio detection unit, and controls an air/fuel ratio of air/fuel mixture admitted into the secondary engine based on the air/fuel ratio detected by the sixth air/fuel ratio detection unit.

25 9. The exhaust emission control system according to claim 1, wherein:

an activated state of the exhaust emission purifying device is determined;
and

when it is determined that the exhaust emission purifying device is not in the activated state, the secondary engine is started.

10. The exhaust emission control system according to claim 1, further comprising a temperature detection unit that detects a temperature of an catalyst of the exhaust emission purifying device, wherein the secondary engine is stopped when the detected temperature of the catalyst is equal to or higher than a predetermined value.

5 11. The exhaust emission control system according to claim 1, wherein:
the exhaust emission purifying device comprises an NO_x absorbing type catalyst; and

an air/fuel ratio of air/fuel mixture admitted into the secondary engine is controlled into a rich state with respect to a theoretical air/fuel ratio when quantity of NO_x absorbed in the NO_x absorbing type catalyst becomes equal to or larger than a
10 predetermined value.

12. The exhaust emission control system according to claim 1, further comprising:

a first valve position detection unit that detects an exhaust valve position of
15 the primary engine;

a second valve position detection unit that detects an intake valve position of the primary engine;

a third valve position detection unit that detects an exhaust valve position of the secondary engine; and

20 a fourth valve position detection unit that detects an intake valve position of the secondary engine, wherein:

an operation for stopping a drive of the primary engine is inhibited when it is determined that the intake valve and the exhaust valve of the primary engine are opened based on output values detected by the first and the second valve position detection units;

25 and

an operation for stopping a drive of the secondary engine is inhibited when it is determined that the intake valve and the exhaust valve of the secondary engine are opened based on output values detected by the third and the fourth valve position detection units.

13. The exhaust emission control system according to claim 1, further comprising:

a first intake air quantity detection unit that detects a flow rate of intake air admitted into the primary engine; and

5 a second intake air quantity detection unit that detects a flow rate of intake air admitted into the secondary engine, wherein:

quantity of fuel injected into the primary engine is controlled in accordance with the flow rate of intake air detected by the first intake air quantity detection unit; and

10 quantity of fuel injected into the secondary engine is controlled in accordance with the flow rate of intake air detected by the second intake air quantity detection unit.

14. An exhaust emission control system for a vehicle including a primary engine and a secondary engine having a displacement smaller than that of the primary engine, the exhaust emission control system comprising an exhaust emission purifying device that purifies exhaust gas discharged from the secondary engine, the exhaust
15 emission purifying device being warmed under heat of exhaust gas discharged from the primary engine.

15. The exhaust emission control system according to claim 14, wherein the secondary engine is operated to drive an accessory of the vehicle.

20 16. The exhaust emission control system according to claim 14, wherein:
an activated state of the exhaust emission purifying device is determined;
and

when it is determined that the exhaust emission purifying device is not in the activated state, the secondary engine is started.

25 17. The exhaust emission control system according to claim 14, further comprising a temperature detection unit that detects a temperature of an catalyst of the exhaust emission purifying device, wherein the secondary engine is stopped when the detected temperature of the catalyst is equal to or higher than a predetermined value.

18. The exhaust emission control system according to claim 14, wherein:

the exhaust emission purifying device comprises an NO_x absorbing type catalyst; and

an air/fuel ratio of air/fuel mixture admitted into the secondary engine is controlled into a rich state with respect to a theoretical air/fuel ratio when quantity of NO_x absorbed in the NO_x absorbing type catalyst becomes equal to or larger than a predetermined value.

19. The exhaust emission control system according to claim 14, further comprising:

a first valve position detection unit that detects an exhaust valve position of the primary engine;

a second valve position detection unit that detects an intake valve position of the primary engine;

a third valve position detection unit that detects an exhaust valve position of the secondary engine; and

a fourth valve position detection unit that detects an intake valve position of the secondary engine, wherein:

an operation for stopping a drive of the primary engine is inhibited when it is determined that the intake valve and the exhaust valve of the primary engine are opened based on output values detected by the first and the second valve position detection units;

and

an operation for stopping a drive of the secondary engine is inhibited when it is determined that the intake valve and the exhaust valve of the secondary engine are opened based on output values detected by the third and the fourth valve position detection units.

20. The exhaust emission control system according to claim 14, further comprising:

a first intake air quantity detection unit that detects a flow rate of intake air admitted into the primary engine; and

a second intake air quantity detection unit that detects a flow rate of intake air admitted into the secondary engine, wherein:

quantity of fuel injected into the primary engine is controlled in accordance with the flow rate of intake air detected by the first intake air quantity detection unit; and

quantity of fuel injected into the secondary engine is controlled in accordance with the flow rate of intake air detected by the second intake air quantity
5 detection unit.